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Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Parts 0, 1, 2, and 15 of the	)	
Commission's Rules regarding Authorization of	)	ET Docket No. 13-44
Radiofrequency Equipment	)	RM-11652
	)	
Amendment of Part 68 regarding Approval of	)	
Terminal Equipment by Telecommunications	)	
Certification Bodies	)	

Comments of Marcus Spectrum Solutions LLC

SUMMARY

The present equipment authorization rules are outdated with respect providing a credible enforcement mechanisms consistent with today's technologies and today's equipment market structure. These comments propose pragmatic evolutionary changes to make enforcement a more credible thereat so as to deter cheating that could both cause interference and disrupt marketplace forces.

INTRODUCTION

Marcus Spectrum Solutions LLC (MSS) is the consulting practice of Michael J. Marcus, Sc.D., F-IEEE, a retired senior executive from FCC who worked at the Commission nearly 25 years in *both* the spectrum policy and enforcement areas. His

qualifications are well know to the Commission[2]. These comments are not being submitted on the behalf of any client and are being submitted purely in the public interest.

The focus of these comments is on improving the Commissions Equipemtn Authorization Program with respect to making enforcement of the Commission's Rules both practical and credible. This program was evolved over decades and during most of that period the value of the equipment subject to FCC equipment authorization was a neglible proportion of GDP. However, with the digitization and increased mobility of today's society and economy, the FCC program *now* deals with equipment that constitutes a significant fraction of GDP and the national balance of international trade.

Offshore manufacturers produce now a much greater fraction of the equipment than when the current concepts were formed. Whereas in the past offshore manufacturers usually had common corporate ownership with their US importer, in recent years agile offshore manufacturers have emerged that provide production capability for many brands and are not directly related to the US importers and are not themselves FCC regulatees.

If the enforcement in the Equipment Authorization Program is not <u>both</u> practical and believable there are two very real harms that could result:

1. Legitimate manufacturers who comply in detail with the rules could be put at real competitive disadvantage by competitors, often overseas based, who can both undersell them and reach market faster by ignoring the rules. In today's dynamic markets speed to market access is key, a factor that was not so

[2] FCC Press Release "FCC Engineering Michael J. Marcus Honored by Institute of Electrical and Electronics Engineers (IEEE)" February 3, 2004, (http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-243463A1.pdf)

important 2 decades ago when model introduction was much slower and not as responsive to introduction of new products by competitors.

2. These rules were not put in place to slow the introduction of equipment models, rather they were put in place to prevent harmful interference to legitimate licensed and unlicensed spectrum users as well as federal users authorized by NTIA. As NAB and CTIA frequently point out, their members have invested hundreds of billions of dollars in communications infrastructure that was designed assuming the Commission's rules were complied with.

LESSONS FROM THE PAST

FCC has had significant staff turnover in the past decade so corporate knowledge is not as good as it might be. Therefore it is appropriate to recount 2 incidents that occurred during the commenter's FCC career.

Incident 1 was a conversation with the well respected inhouse FCC regulatory attorney of a firm that at the time was one of the largest electronics retailer in the US. This firm sold many proprietary models maufactured for them overseas. The attorney recounted the pressure he consistently received from top executives of his employer to introduce models faster and at lower cost by ignoring FCC equipment regulation. He was able to "keep his finger in the dike" by pointing out that FCC enforcement of equipment regulations were quite creditable at that time and that the firm could not afford to risk detection of noncompliance and the large penalties that were expected and common practice then.

Incident 2, also about 20 years ago, involved a overseas manufacturer with a large US market share even though it was not the market leader in any major sector. A

competitor had reported to FCC that the manufacturer's cordless phone increased performance by exceeding the Commission's power limits and provided a unit that was bought in a retail store.

FCC Laboratory tests confirmed that the power was too high and a sample was requested from the manufactuere under the terms of §2.936.[3] The requested sample unit arrived and was found to comply with the regulations. Why? Disassembly of the sample unit alongside the retail unit submitted by the competitor showed that the 2 units differed in 2 specific components (resistors) that controlled the output power. Furthermore examination of the components on the printed circuit boards in which they were mounted showed that in the unit submitted by the competitor the soldering pattern of the 2 differing components was consistent with large scale production techniques while in the sample submitted by the manufacturer the 2 components were soldered separately and by hand after the other components were mounted in a production operation, probably as an *ad hoc* modification of a production unit.[4] In other words the maufacturer submitted a doctored unit that had been modified for the FCC's benefit!

The industry pressures described here are much high now due to the larger size of the industry subject to FCC regulation and the transfer of most manufacturing overseas where much of it is done by firms that are not directly FCC regulatees. Technology

[3] 47 CFR 2.936

[4] Further proof was that in the unit submitted by the competitor all components' leads were cut squarely and evenly on the underside of the printed circuit board by a guillotine-like device on a production line. In the unit submitted by the manufacturer the 2 resistors that differed in value had leads whose ends were wedge shaped and apparently were cut by hand with side cutting pliers. This was independent confirmation that the manufacturer had modified the production unit in the sample he submitted to FCC.

changes also make the situation worse: Many unit subject to FCC regulation are in fact "software defined radios" although due to quirks of the FCC Rules they do are not classified as such and are not subject to the provisions of §2.944.[5] But whereas the manufacturer in Incident 2 had to physically modify the hardware of the cordless phone sample in bring it into compliance, in many cases today the manufacturer need only change the software in the unit to create a "lab queen" that is in compliance![6] Thus while the hardware fraud of 20 years was easy to detect upon disassembly, today's comparable frauds would be much harder to detect and may be beyond the technical capabilities of the Commission's Laboratory which does not deal routinely with the software content of microprocessors in wireless equipment.

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[5] Only 326 equipment authorizations for models formally identified as "software defined radio" have ever been issued by the Commission. The vast majority of grants in 2012 were to 4 grantees for what appears to be all radio local area network equipment models. Thus the much wider use of digital controllers in FCC authorized equipment is not formally recognized under present FCC reporting. Yet the widespread use of digital controllers for key transmitter parameters allows easy modification of software to make noncompliance equipment appear compliant in doctored samples obtained from the grantee. (This numeric data is derived from the OET/EAS database - https://apps.fcc.gov/oetcf/eas/reports/GenericSearch.cfm)

[6] The recent NPRM in Docket 13-49 (5 GHz) acknowledges that such software modification of authorized equipment has occurred numerous times with 5 GHz U-NII equipment and has been a major cause of harmful interference to safety-related federal radars. See NPRM, Docket 13-49 at para. 25,43,49,51

PROPOSED IMPROVEMENTS

MSS proposes for the Commission's consideration several incremental changes in equipment authorization procedures to deter cheating and to prosecute cheaters.

1. **Criminalize the submission of fraudulent postmarket samples.**

Modify the terms of §2.936 to require that the unit shipped for testing to either a TCB or to the FCC Laboratory must include a letter signed by an agent of the grantee who resides in the US certifing that the unit submitted was taken from normal wholesale or retail inventory without any modification and without any selection based on performance testing. Preshipment testing of the unit would be allowed but such testing can not be the basis of unit selection other than for verifying basic functioning of the unit.

The letter should state that the information is true and the signer is aware that the penalties of 18 USC 1001 apply to any false statements. While it is not clear if 18 USC 1001 applies to statements made to a TCB, as opposed to a federal entity, this problem could be avoided by requiring that the letter be sent to *both* the TCB requesting the sampling and the FCC Laboratory. This would clearly criminalize the misrepresentation that has gone unpunished in the past.

2. **Codify key terms of KDB Publication No. 610077[7] and increase post-market sampling rate of TCBs**.

This publication, "TCB Post-Market Surveillance", is mentioned in the NPRM at para .30 but is not discussed in any detail. While the commenter is not a lawyer, a review of this publication raises serious questions about whether its terms have been adopted consistent with the Administrative Procedures Act, as amended. In particular the noncodified publication has this requirement for post-market surveillance:

> "The total number of products audited by the TCB shall consist of at least five percent of the total number of products certified by the TCB, under Scope A – Unlicensed Radio Frequency Devices and Scope B – Licensed Radio Service Equipment, for the calendar year. A 'product' is considered to be each grant of Certification issued."

This 5% requirement is a key issue in the whole equipment authorization process and is a real cost issue for the TCBs. Is it legally appropriate that this be quantified in an obscure document issued under delegated authority? In addition the 5% rate is <u>much too low</u> in today's market where models have much shorter lifetimes than the past and where the grantee is often an entity with a short lifetime, not a major manufacturer. MSS propose that the Commission codify many of the provisions of this publication in its Rules but give the staff flexibility in adjusting the sampling in a stated range. The range that appears to be more realistic as a deterrent is 10-25%, although reasonable people might disagree.

[7] FCC/OET, "TCB Post-Market Surveillance", 10/25/2011 (https://apps.fcc.gov/oetcf/kdb/forms/FTSSearchResultPage.cfm?id=20540&switch=P)

3. **Address TCBs' basic conflict in post-market testing.**

The basic concept of TCBs selecting and testing post market models of their own clients is a basic conflict of interest for the TCBs. While limited FCC resources limit the amount of testing that can be performed by FCC staff, a better approach would be to require that some of the testing be done under control of TCBs other than the one which approved the equipment. Thus the Commission should require that the TCBs exchange among themselves some of the market surveillance testing.

4. **Make post-market surveillance credible by including consistent retail sampling.**

Without some credible retail market sampling postmarket surveillance may not be credible at all. As mentioned in the context of Incident 2 above, today's software implementation of key parameters in equipment makes software-based modifications both easy to do and hard to detect. MSS urges the Commission to make postmarket surveillance a viable deterent by requiring that some of the samples used by the TCBs market surveillance testing be obtained by the TCB staff at normal retail outlets or by TCB staff picking the units out of wholesale inventory. TCBs have contractual relationships with their clients and the TCBs could be required to make arrangements with their clients to be reimbursed for the costs of retail purchases of test samples or to increase their approval prices to cover such cost. Thus this could be required in a way that does not affect competition among TCBs.

CONCLUSIONS

MSS congratulates the Commission for opening this rulemaking on this vital topic that needs attention to keep up with current market structure and technology. While the present rules served the industry and the public well in the past, making enforcement of the rules more credible will both prevent interference events and encourage continuing vital capital formation for wireless infrastructure. It will also create a level playing field with manufacturers where they compete on the quality of their product *not* the price achieved by skimping on rules compliance.

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cc: Julius Knapp
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